

Climate change and biodiversity
(cartoon)

Species at risk - montage

Nature Jan 1 2004 cover

Aloe dichotoma

(quiver tree)

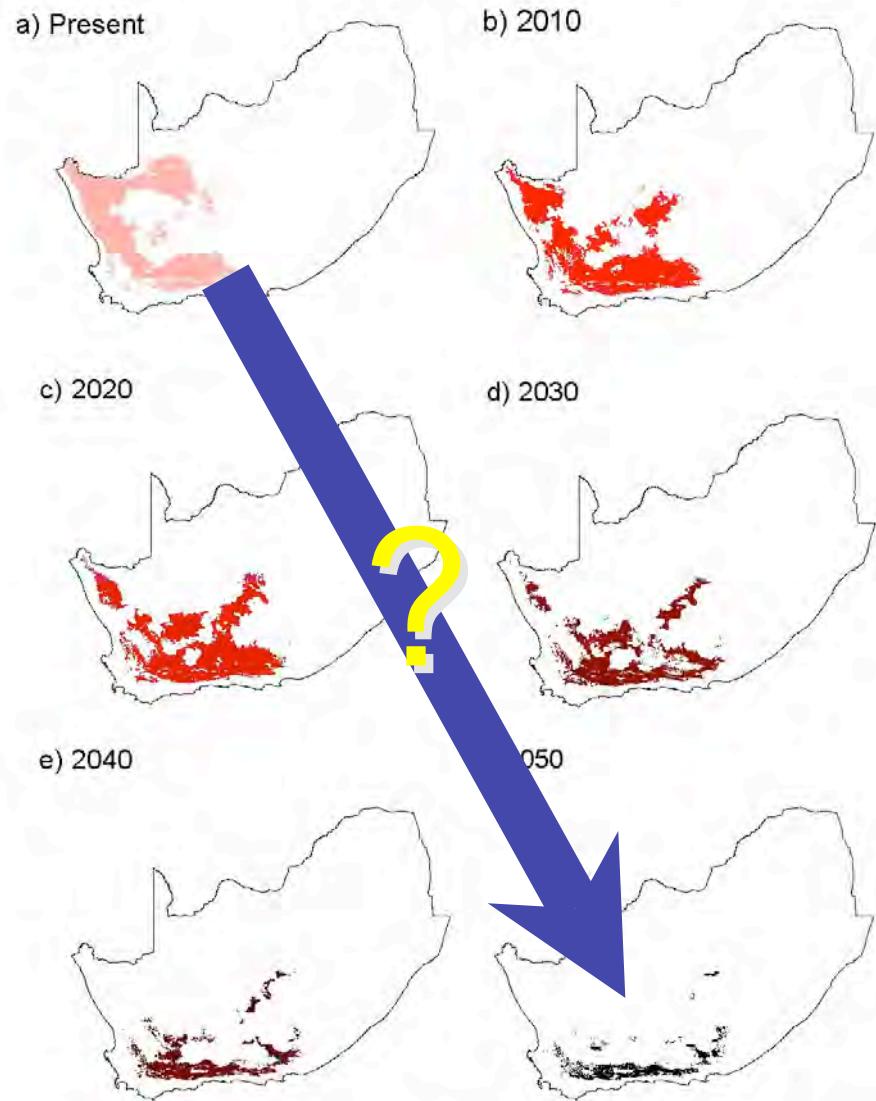
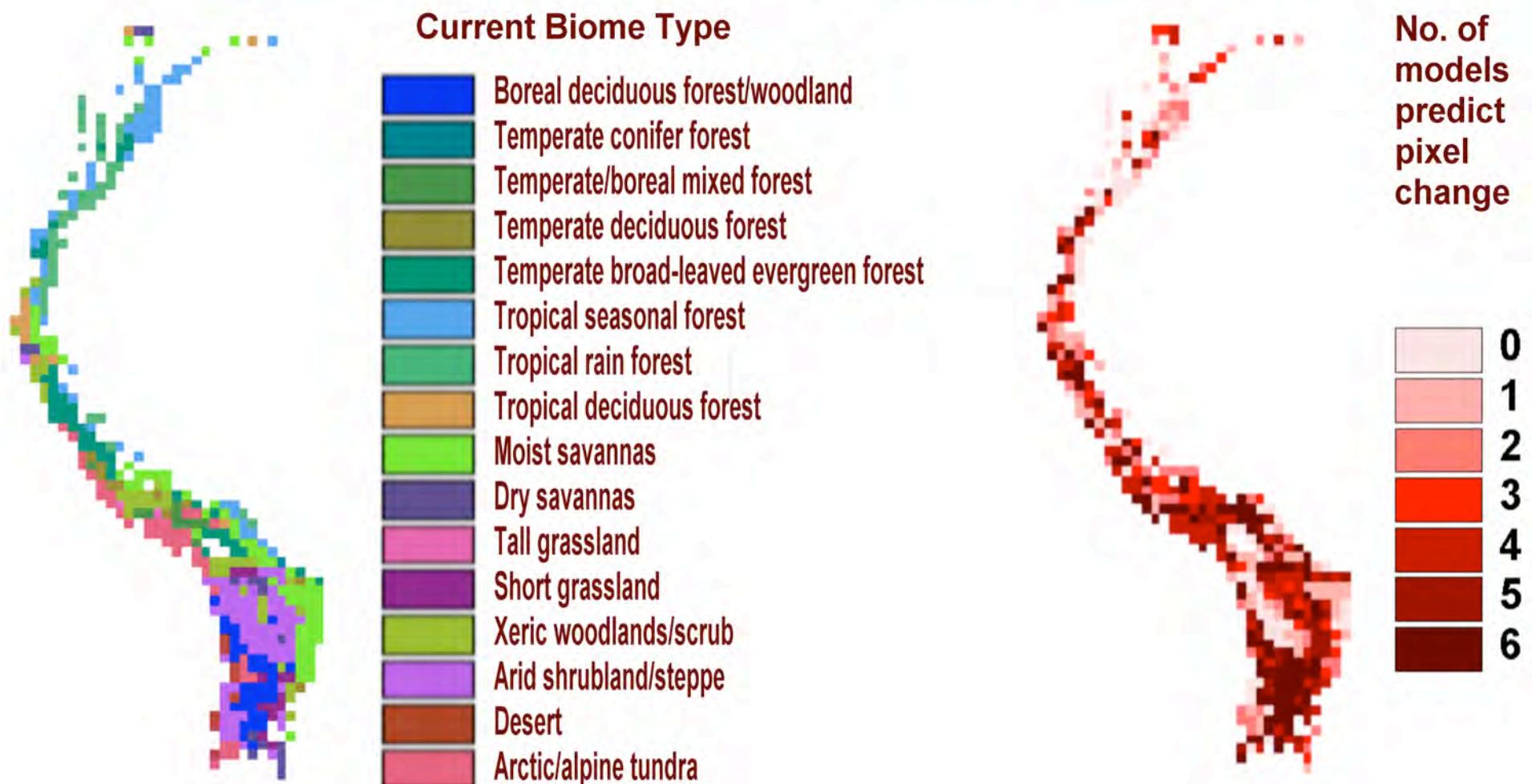
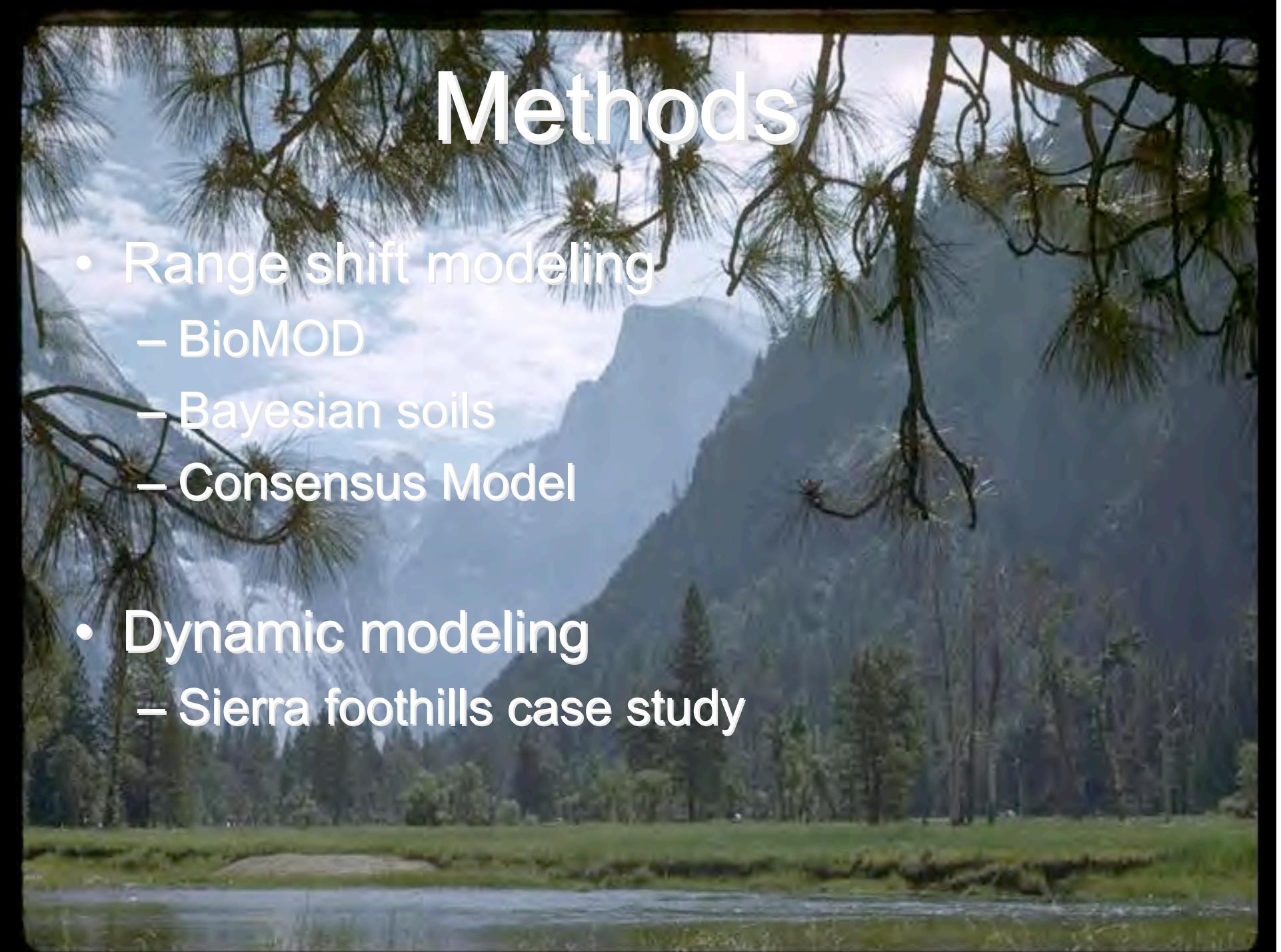


Figure 4: Maps showing bioclimatic envelope projections for *Aloe dichotoma* in South Africa based on the HadCM2 (no-sulphates) model for a) the present, b) 2010, c) 2020, d) 2030, e) 2040 and f) 2050. Red points show the current distribution.

Andes Hotspot maps from BIOME for original class biome types



A scenic view of a mountain range with pine trees in the foreground.

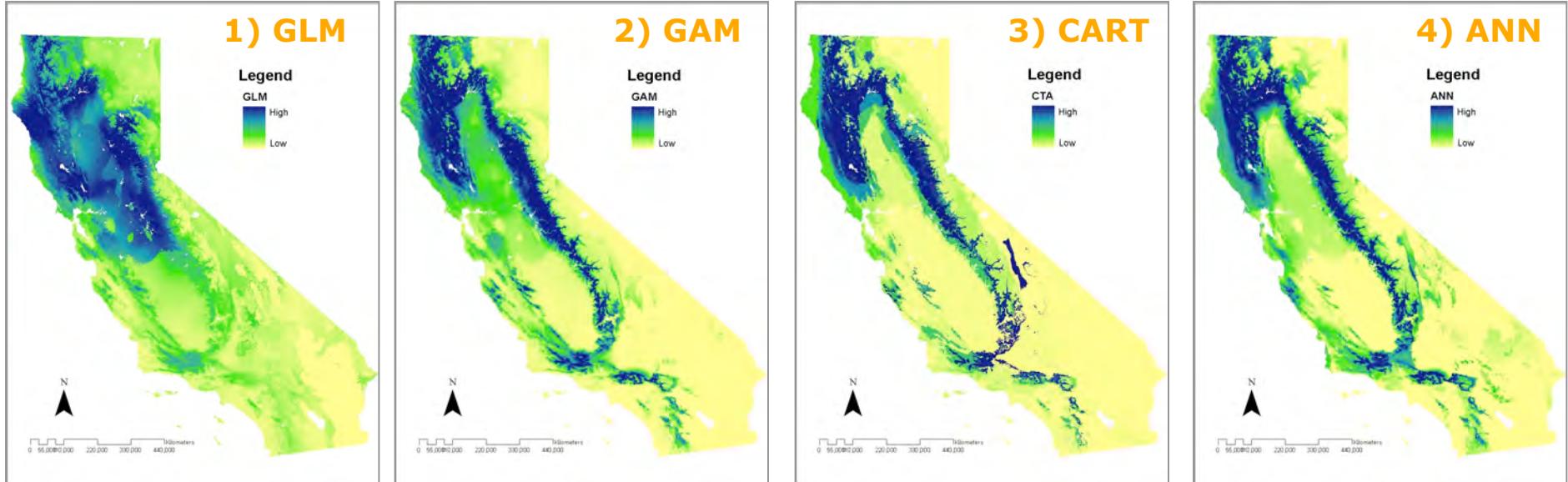
Methods

- Range shift modeling
 - BioMOD
 - Bayesian soils
 - Consensus Model
- Dynamic modeling
 - Sierra foothills case study

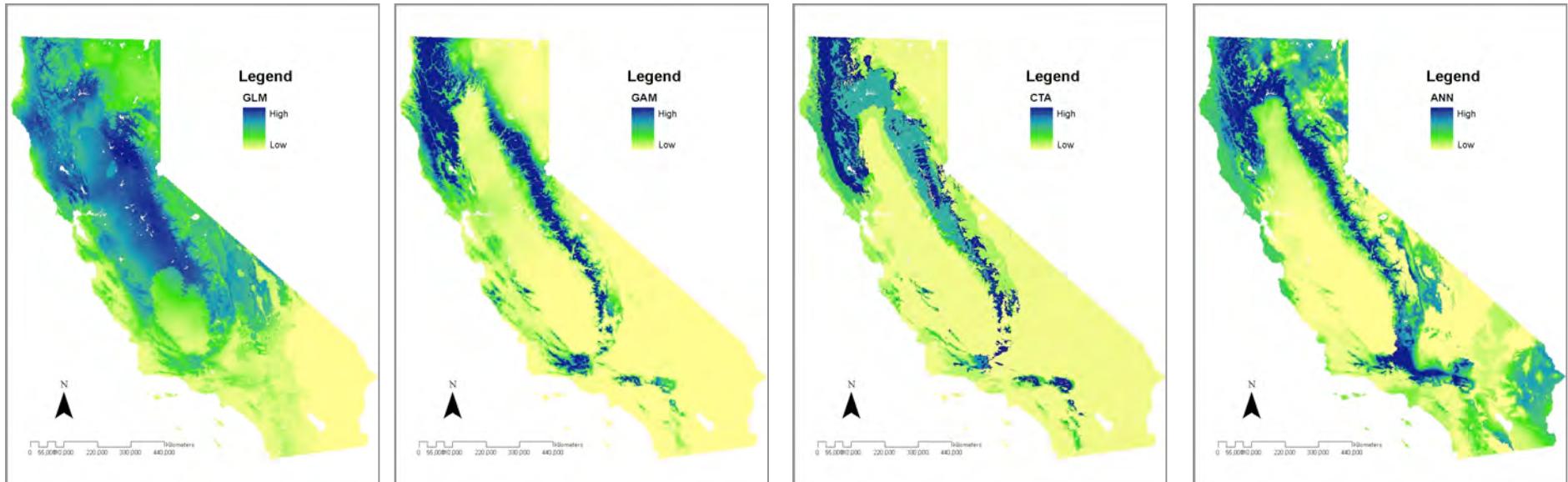
BioMOD

(Thuiller et al 2003)

The probability map under **the current climate**

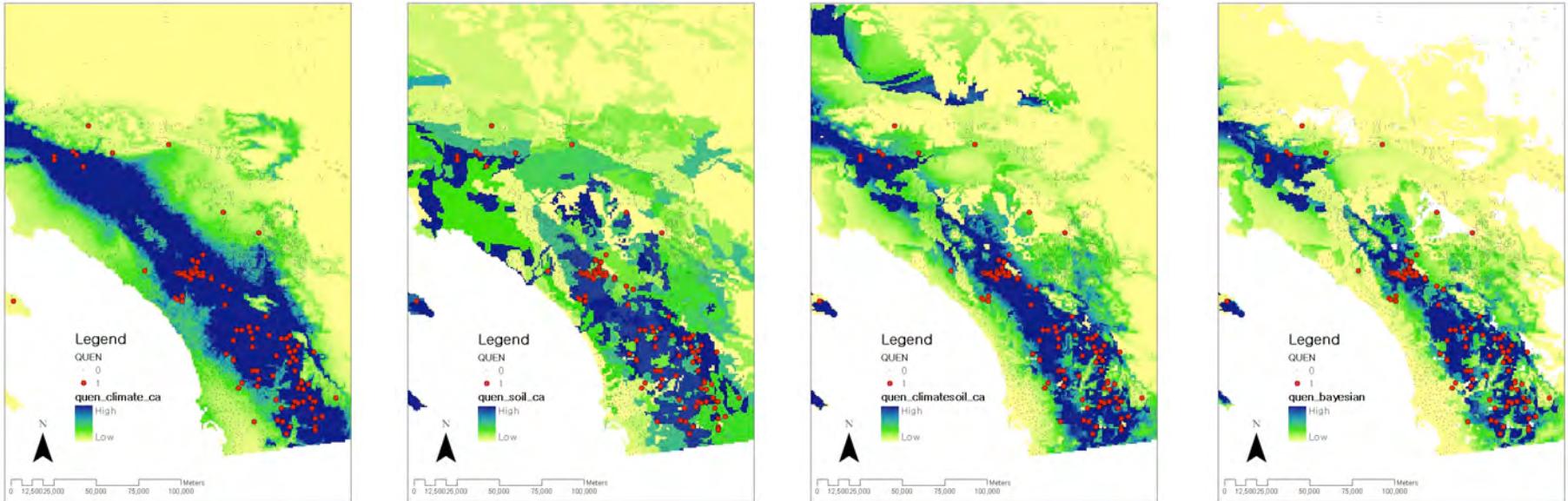


The probability map under **the future climate**

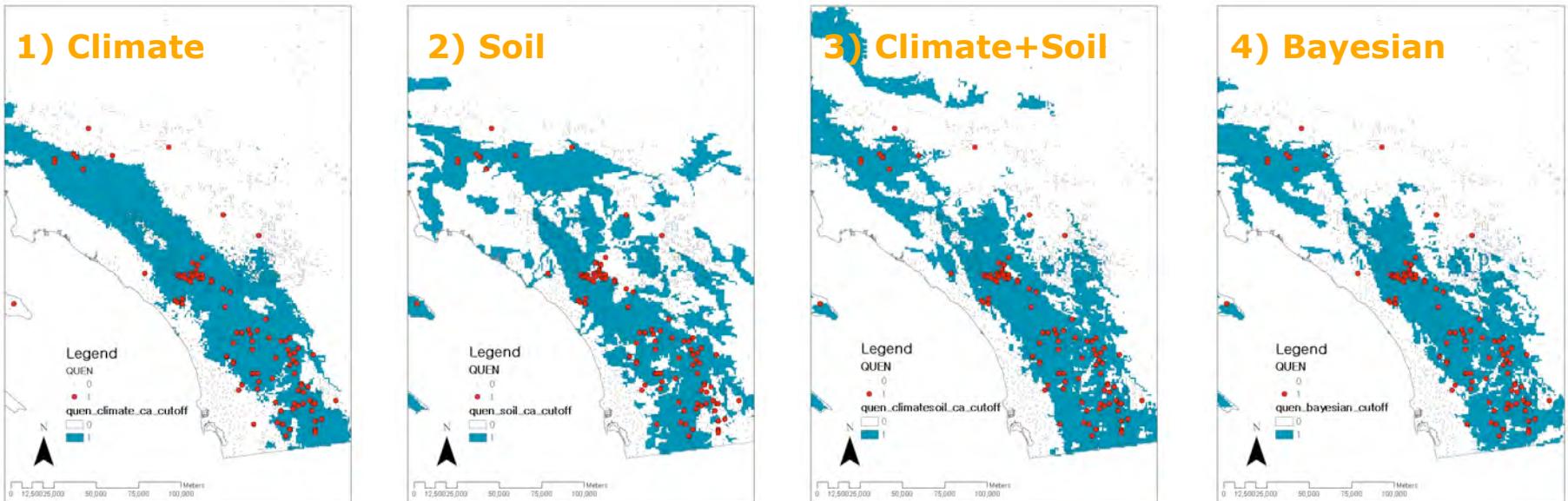


Bayesian suitability

The probability map under **the current climate**

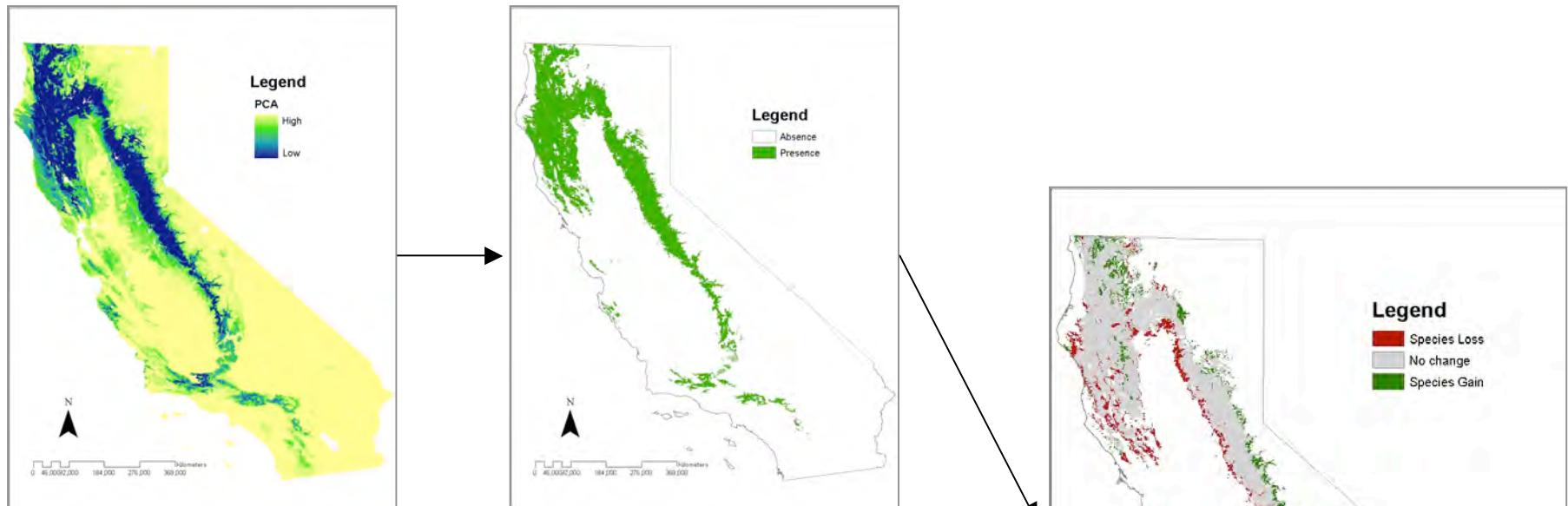


The probability map under **the future climate**

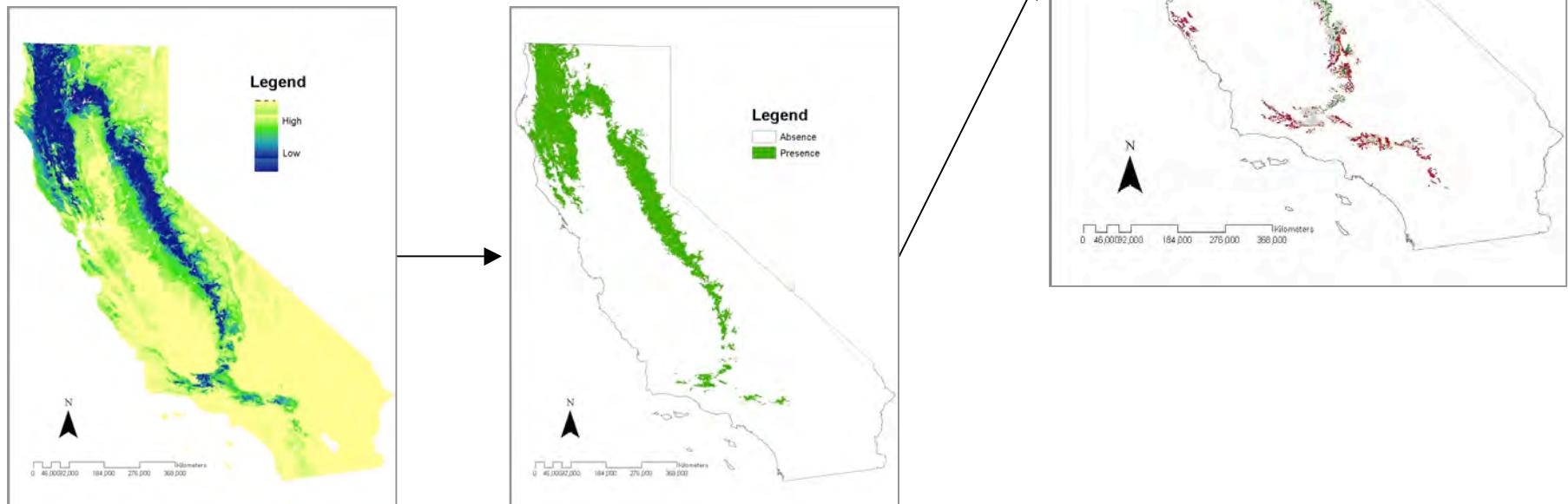


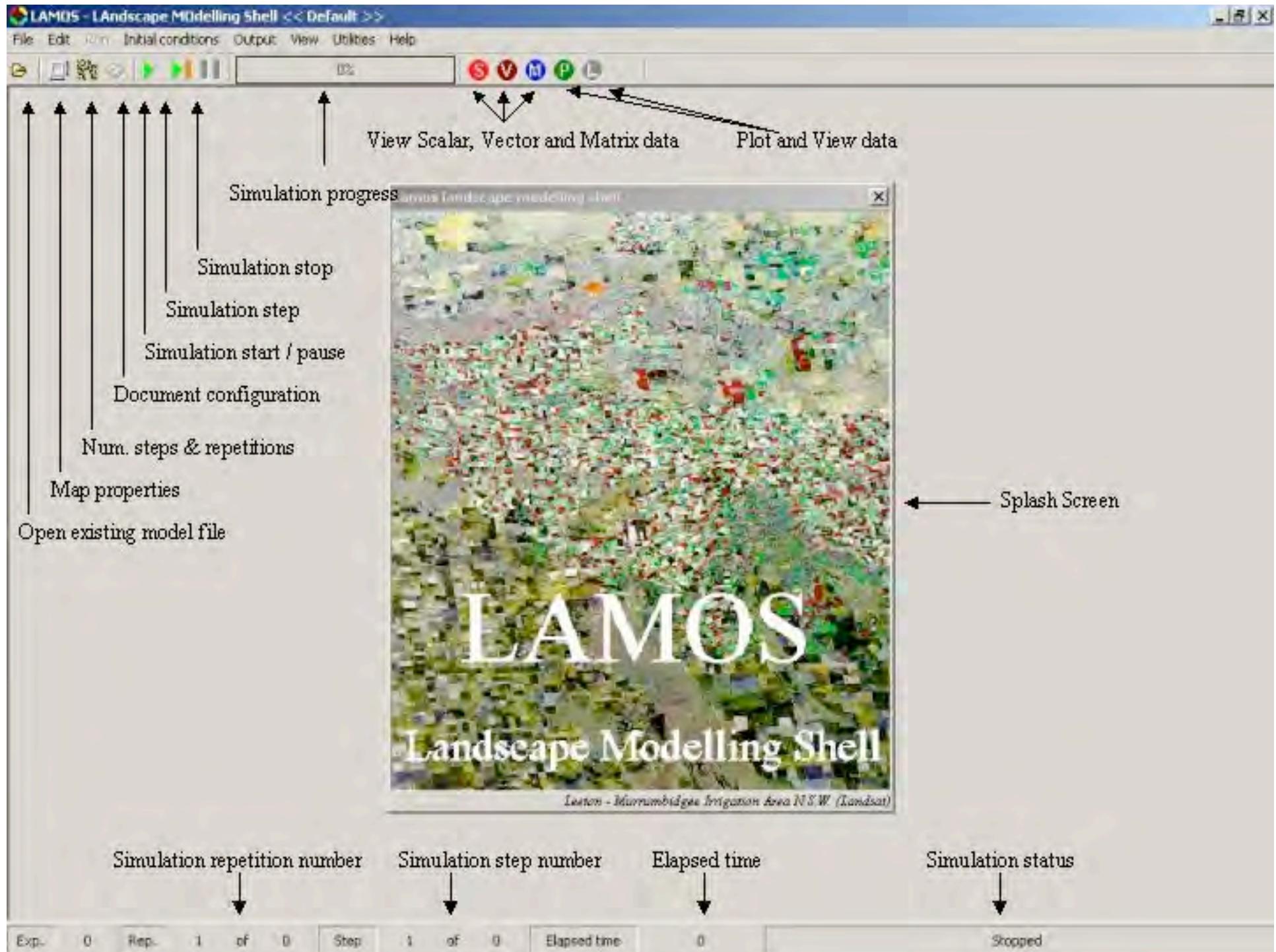
Consensus model

The predicted distribution under **the current climate**



The predicted distribution under **the future climate**







0%

BiomoveII Parameters

Life history and seedpools | Resource response | Morphology | Disturbance | Biomove | **Biomove**

Traits | Competition | Disturbance | Envelopes | Dispersal |

Age class limits

Seeding <=	5
Immature <=	30
Mature <=	300
Senescent <=	400

Seedlings	70
Immature	10
Mature	2
Senescent	95

Max cell population: 100000

Fecundity

Mature	8
Senescent	2

Seed pool life span

Active	1
Dormant	50

Relative growth rate

RGR at 10 envelope values

Envelope 1 10% -0.01444675
Envelope 100% 0.03096518

Fixed scale

Calculate intra-lifecycle abundances

Calculate RGR

Age classes

Pool
Sdlg
Juv
Mat
Sen

OK Cancel Help

BiomoveII Parameters

Life history and seedpools | Resource response | Morphology | Disturbance | Biomove | **Dispersal**

Kernel

Mean dispersal distance (pixels)

Maximum reach of kernel (pixels) 7.368

Enable long distance dispersal

% of seed reserved for long distance dispersal

Long distance dispersal

Long distance dispersal Algorithm

Long distance event frequency mode

Long distance event frequency 0.00000000

Max long distance throw (pixels)

Continuous kernel Long distance

Show total %seed per distance

% of seed distributed in pixel units

Seed

number of pixels from seed source

26.838
5.411
1.448
0.517
0.207
0.089
0.04
0.017
1

% of seed per pixel

distance (pixels)

Calculate intra-lifecycle abundances



BiomoveII Parameters

Life history and seedpools | Resource response | Morphology | Disturbance | Biomove | **Severe**

Age class	Killed	Resprout	Resprouting age
Youngest < 0 years	All	None	0
Middle < 0 years	All	None	0
Oldest	All	None	0

Prop. killed All Dorm. break fraction None

Medium

Age class	Killed	Resprout	Resprouting age
Youngest < 0 years	Most	None	0
Middle < 0 years	Most	None	0
Oldest	Most	None	0

Prop. killed Most Dorm. break fraction None

Mild

Age class	Killed	Resprout	Resprouting
Youngest < 0 years	Half	None	0
Middle < 0 years	Half	None	0
Oldest	Half	None	0

Prop. killed Half Dorm. break fraction None

Functional Group

Pine

Disturbance

Fire

Disturbance severity classes

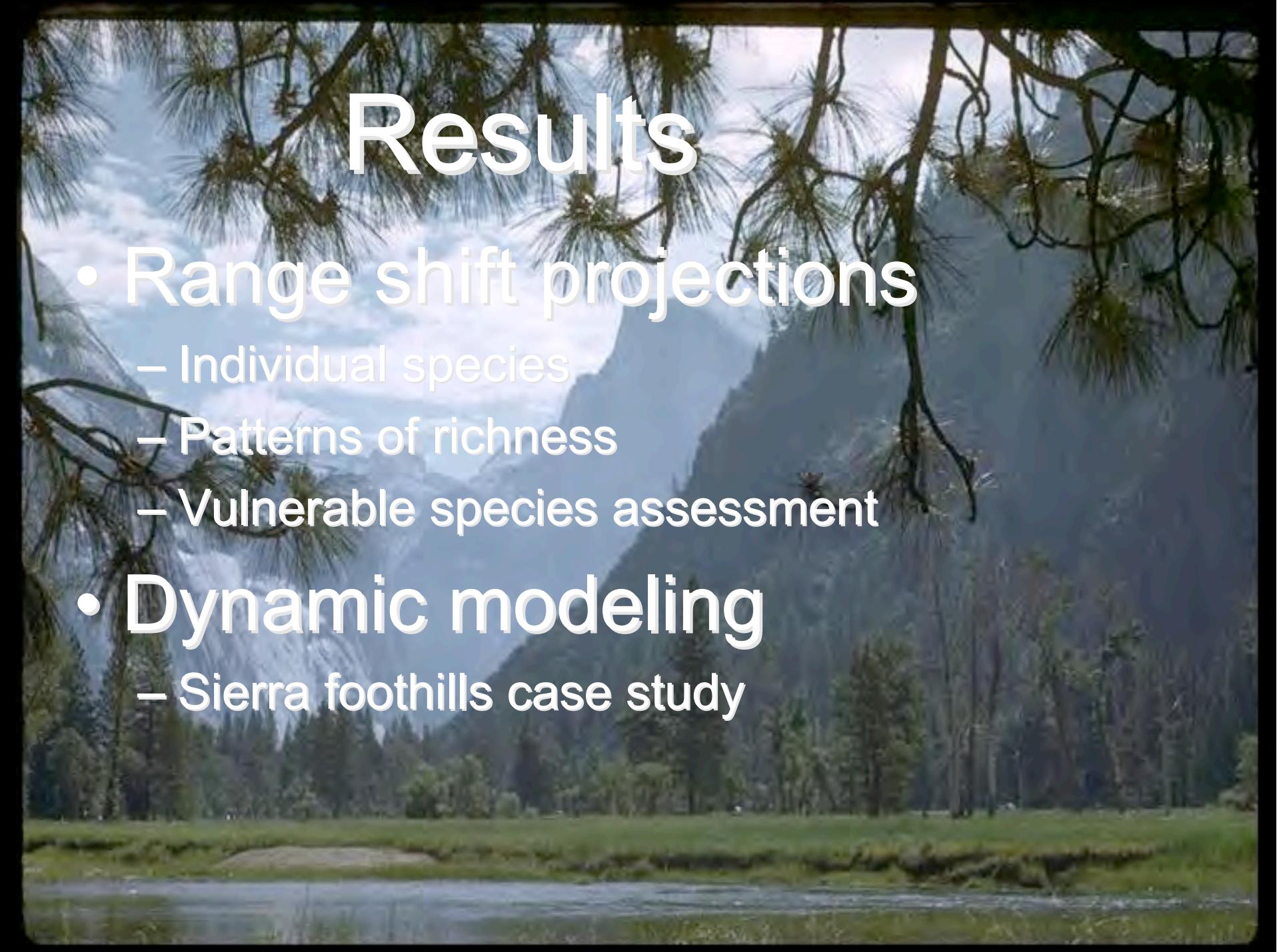
Severe <= 1	0.0000
Medium <= 0.0000	0.0000
Mild <= 0.0000	0.0000
None <= 0.0000	0.0000

Susceptibility

Stratum	Juvenile	Mature	Allocation
3 Top	0	0	0 0
2 Middle	0	1	0 1
1 Bottom	1	0	1 0

Calculate intra-lifecycle abundances

OK **Cancel** **Help**

A scenic view of a forested mountain range with a river in the foreground. The image shows tall evergreen trees in the foreground, a winding river, and majestic mountains covered in snow and green forests under a clear blue sky.

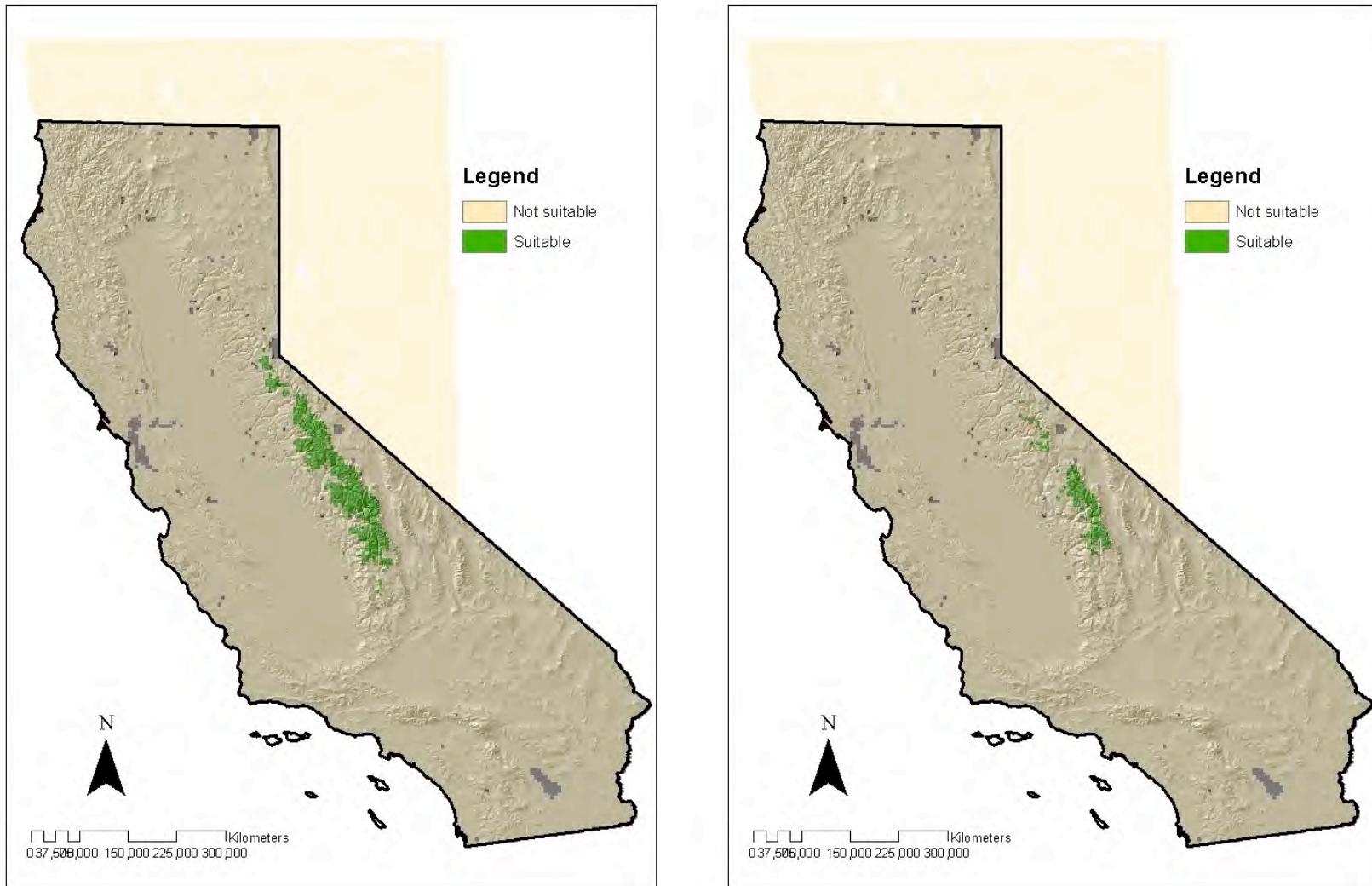
Results

- Range shift projections
 - Individual species
 - Patterns of richness
 - Vulnerable species assessment
- Dynamic modeling
 - Sierra foothills case study

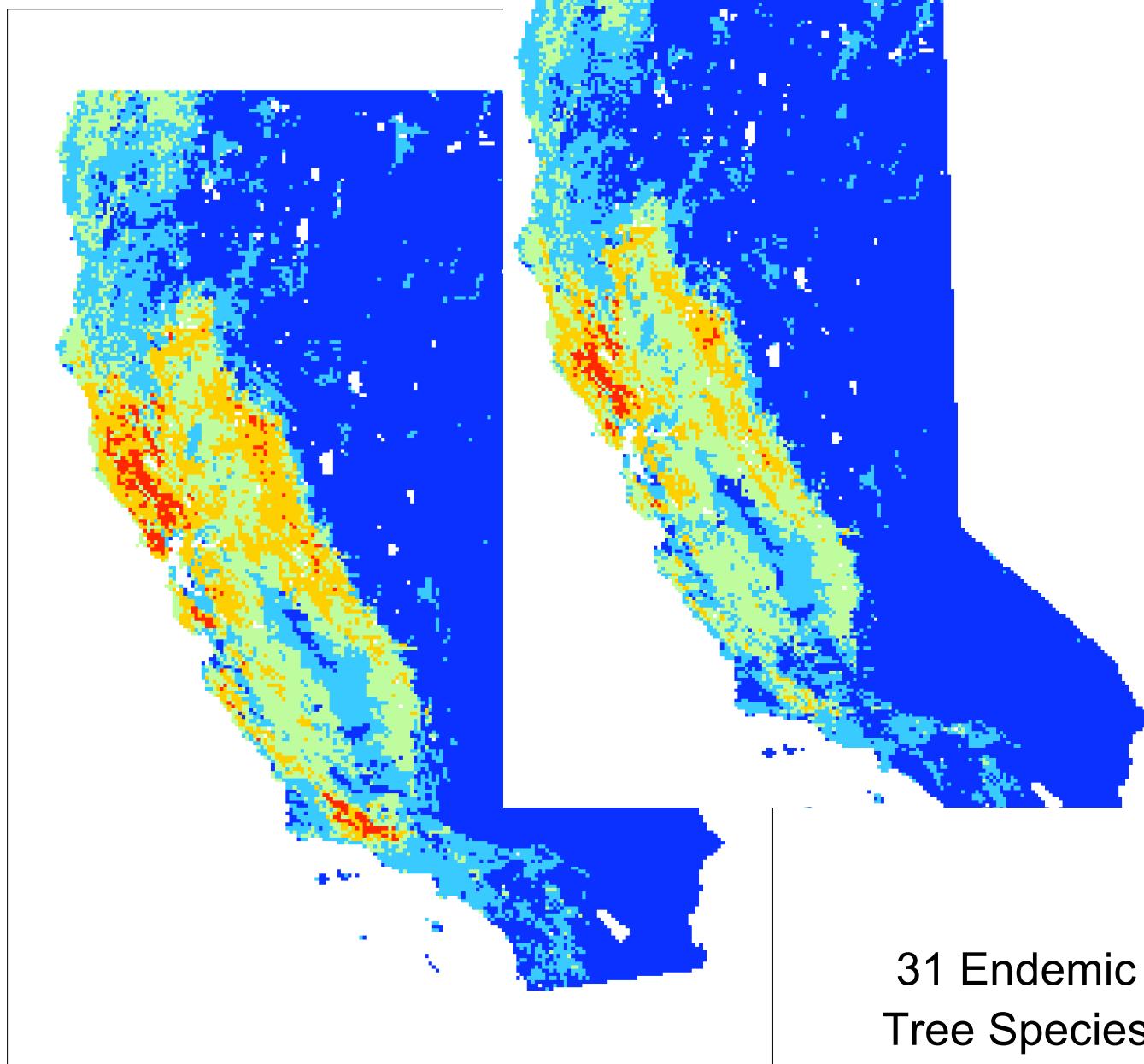
Range Shift: *Q. garryana*



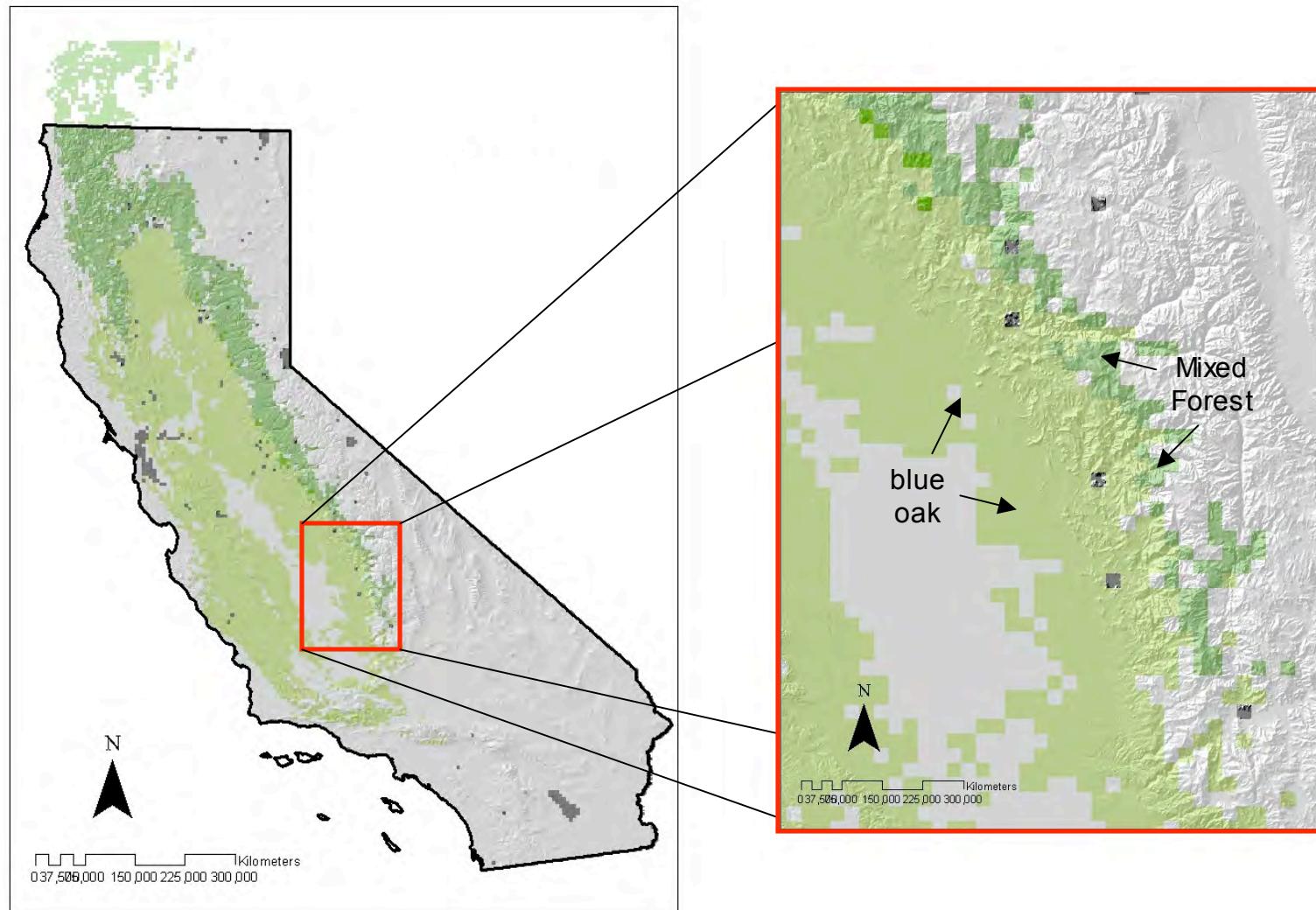
Range Shift: *P. contorta*

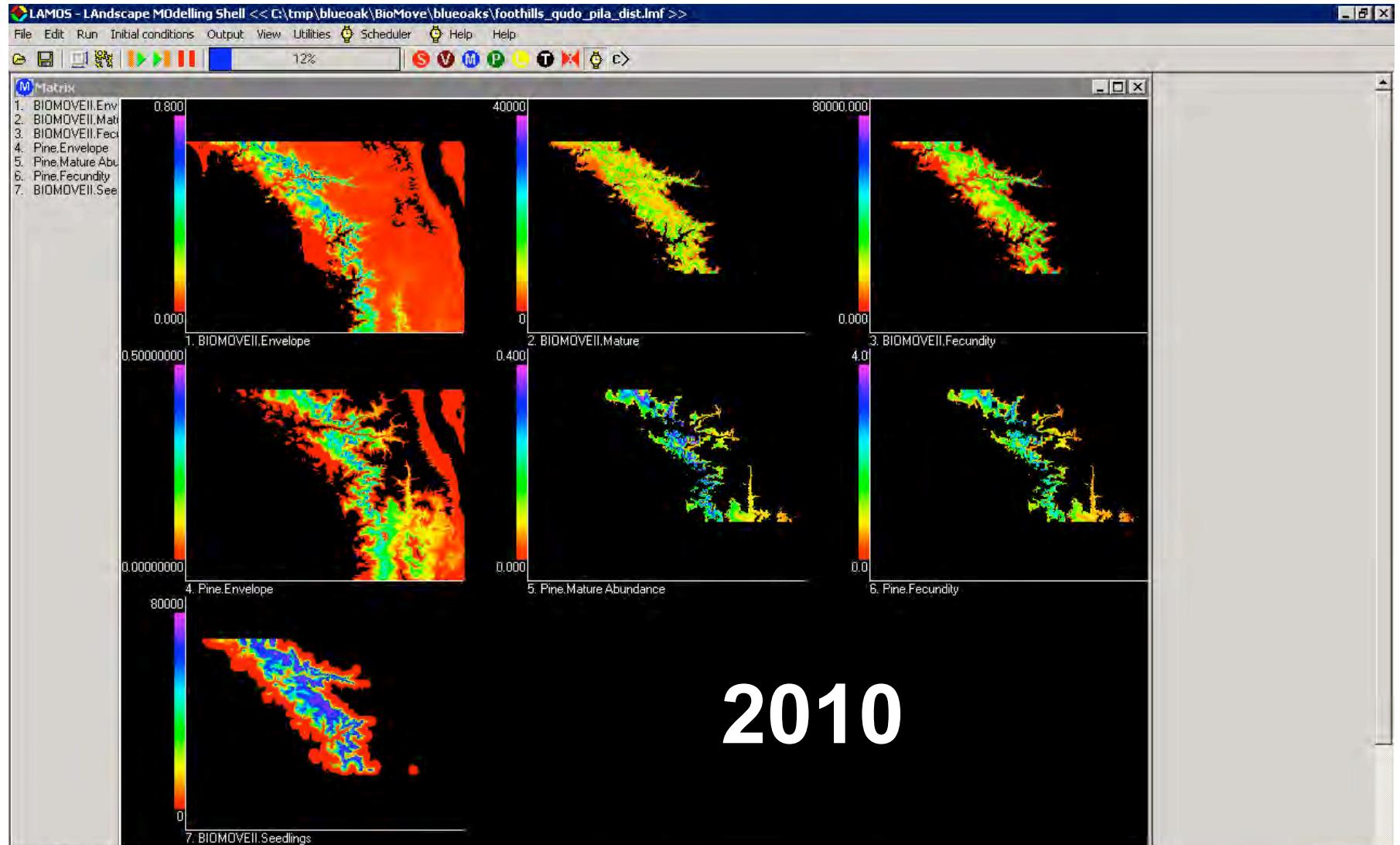


Endemic Richness



Case Study Area: Southern Sierra Foothills





2010

[Row,Col] [23,84]=0.0

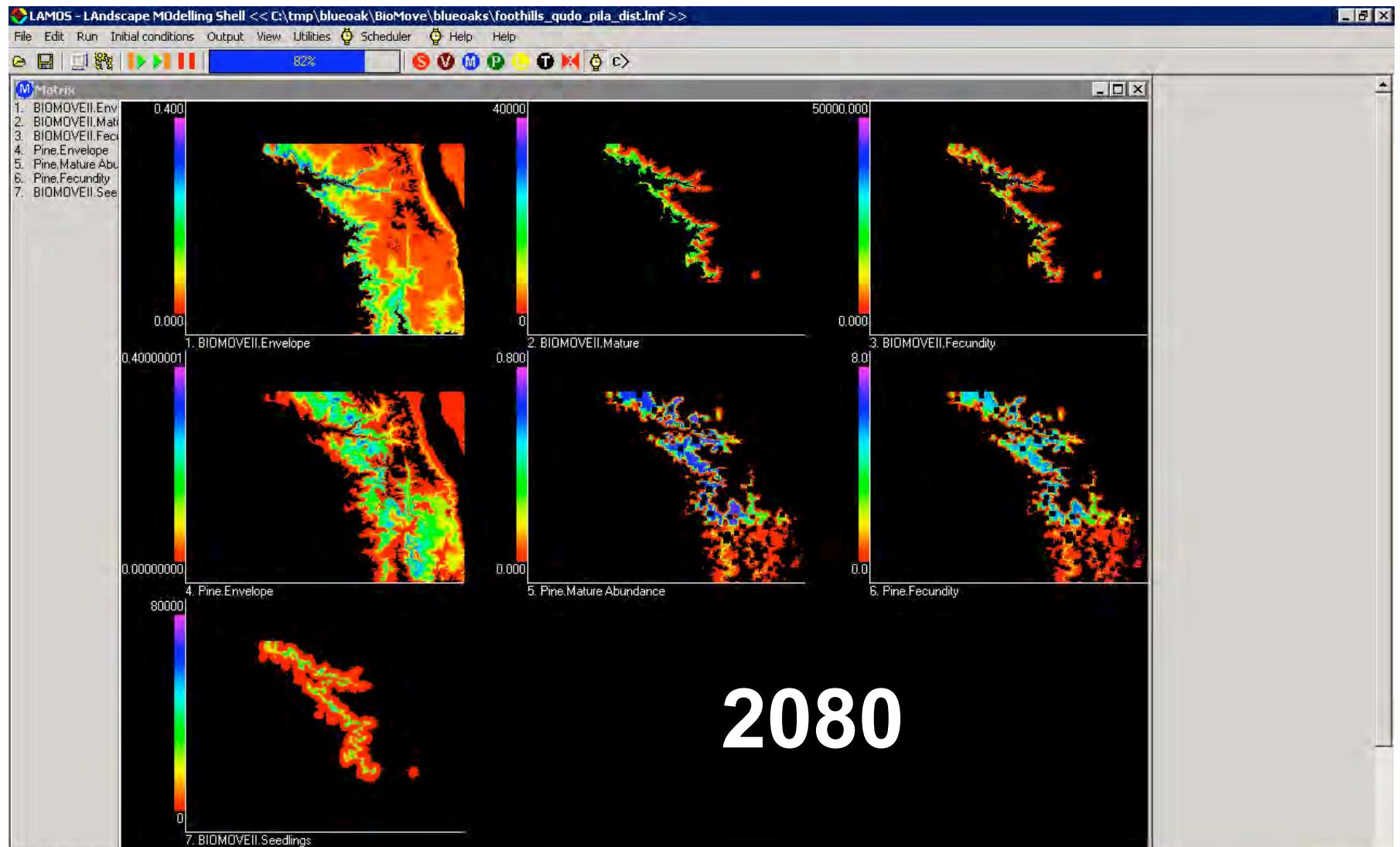
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Scheduler

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set "Pine.Envelope"="C:\tmp\blueoak\DIVA\csiroA2a_flt\PILA_clip\pca00.flt";
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Exp. 1 Rep. 0 of 1 Step 12 of 100 Elapsed time 12:00:14 AM Paused

Start C:\tmp\blue... C:\tmp\LM3... div2006090... Untitled - Ar... Arc Arc Lamos302 Microsoft Po... 2:57 PM



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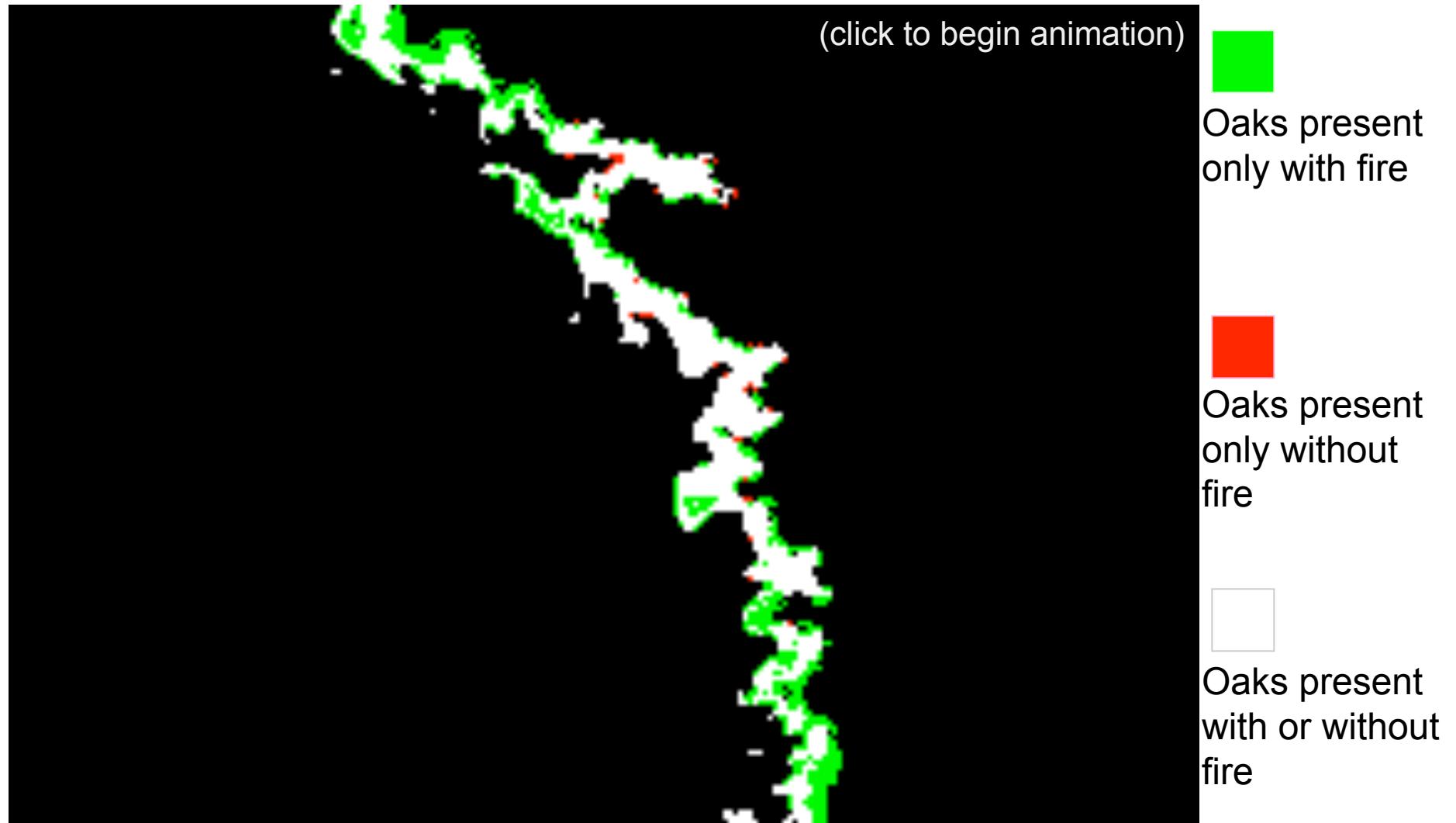
Scheduler

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step=10;
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Exp. 1 Rep. 0 of 1 Step 82 of 100 Elapsed time 12:00:56 AM Paused

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Effects of fire on distribution of blue oaks in presence of competing pine species



Toles Washington Post - cartoon